

SURFACE MOUNTED AND SCANNING SPATIALLY PERIODIC  
EDDY-CURRENT SENSOR ARRAYS

ABSTRACT OF THE DISCLOSURE

Inductive sensors measure the near surface properties of conducting and  
5 magnetic material. A sensor may have primary windings with parallel extended  
winding segments to impose a spatially periodic magnetic field in a test material. Those  
extended portions may be formed by adjacent portions of individual drive coils.  
Sensing elements provided every other half wavelength may be connected together in  
series while the sensing elements in adjacent half wavelengths are spatially offset.  
10 Certain sensors include circular segments which create a circularly symmetric magnetic  
field that is periodic in the radial direction. Such sensors are particularly adapted to  
surround fasteners to detect cracks and can be mounted beneath a fastener head. In  
another sensor, sensing windings are offset along the length of parallel winding  
segments to provide material measurements over different locations when the circuit is  
15 scanned over the test material. The distance from the sensing elements to the ends of  
the primary winding may be kept constant as the offset space in between sensing  
elements is varied. An image of the material properties can be provided as the sensor is  
scanned across the material.